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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,372	04/16/2004	Howard E. Rhodes	M4065.0105/P105-C	8394
24998	7590	08/08/2006	EXAMINER	
DICKSTEIN SHAPIRO LLP			NGUYEN, TUAN H	
1825 EYE STREET NW			ART UNIT	
Washington, DC 20006-5403			PAPER NUMBER	

2813

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/825,372

Applicant(s)

RHODES, HOWARD E.

Examiner

Tuan H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 200, 202--212 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 200 and 202-212 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 200, 202-204, 206, 209-212 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamada et al. (cited ref.).

Yamada et al., figs. 4-5 and related text on col. 4-6 discloses substantially the claimed method for forming a photo sensor comprising excavating a trench by anisotropically etching the semiconductor substrate 302 of a first conductivity type (fig. 5(e)-5(f)); performing an implantation of a second conductivity type into the vertical internal surface region and the bottom surface region of the trench in a rotating slanted manner to form doped region 312 (fig. 5(i)-5(j) and related text in col. 6, paragraph (5)).

Yamada does not expressly disclose the implantation is a plurality of ion implantations at a respective plurality of ion implantation angles including the first implantation angle is orthogonal to the second implantation angle; however, by implanting “in a rotating slanted manner” as disclosed by Yamada, it would have been obvious to one having ordinary skill in the art to recognize that the multiple implantations, including first and second implantations, are inherently included in a

rotating manner, and by implanting to the trench hole in the opposite directions each perpendicular to the charge transfer direction (paragraph bridging col. 5-6, note in fig. 3(d) that shows the charge transfer direction by an arrow pointing from left to right in the doped region 108), it would have been obvious to those skilled in the art to recognize that the slanted angles were inherently orthogonal to each other; moreover, since figs. 5(k)-5(l) show the second conductivity type doped region 312 conformally formed in the trench hole in first conductivity type substrate with uniform thickness as the same as in the instant claimed invention, the implantation angles should inherently be the same.

With respect to claims 203, 204, col. 6, lines 12-14 discloses the formation of silicon dioxide above the vertical internal surface region.

With respect to claim 206, col. 5, line 62 discloses the use of PSG film 309 above the vertical internal surface region.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 205, 207, 208 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (cited ref.) in view of the admitted prior art.

Yamada et al., figs. 4-5 and related text on col. 4-6 discloses the claimed method for forming a photosensor except the use of BPSG or BSG as a passivation layer and CMP for a subsequent step of forming contact and wiring.

However, in paragraphs bridging pages 16-17, applicant clearly admitted that BPSG, PSG, or BSG are well-known material for use in passivating the device and CMP is a well-known process for planarizing in the final steps of forming contact and wiring.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the well-known BSP or BPSG material and CMP process in forming contact and wiring as admitted as prior art in Yamada et al. process for completing the device as in the instant claimed invention.

Response to Arguments

Applicant's arguments with respect to claims 200, 202-212 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tuan H. Nguyen
Primary Examiner
Art Unit 2813